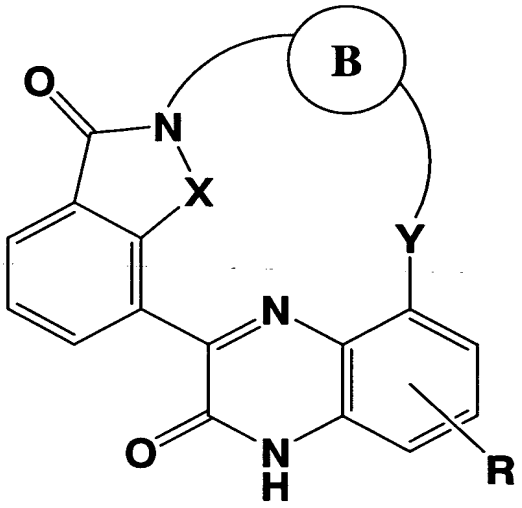
CLAIMS

1. A quinoxalinone derivative of the formula (I):



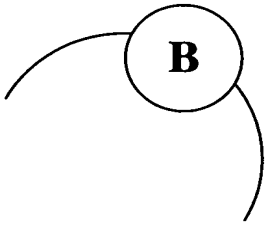
(I)

or a pharmaceutically acceptable salt or ester thereof, wherein;

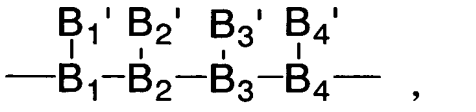
X is NH, S, O or CH_2;

Y is O or NR', wherein R' is hydrogen or lower alkyl;

the partial structure



is selected from the following formula:



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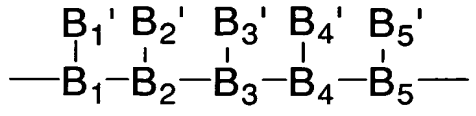
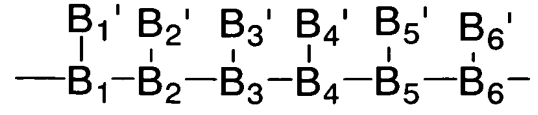


, or



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wherein B_1, B_2, ..., B_{n-1} and B_n, and B'_1, B'_2, ..., B'_{n-1} and B'_n (in which n is 4, 5 or 6) are each defined as follows:

B_1, B_2, ..., B_{n-1} and B_n are each independently C, CH, CR_0, N or O (wherein

when B_1, B_2, ..., B_{n-1} and B_n are each independently C, then B'_1, B'_2, ..., B'_{n-1} and B'_n are oxo, respectively;

when B_1, B_2, ..., B_{n-1} and B_n are each independently O, then B'_1, B'_2, ..., B'_{n-1} and B'_n are each taken together with B_1, B_2, ..., B_{n-1} and B_n, respectively, to form O, with the proviso that two or more members of B_1, B_2, ..., B_{n-1} and B_n, at the same time, are not taken together with B'_1, B'_2, ..., B'_{n-1} and B'_n, respectively, to form O; and

R_0 is lower alkyl), and

B'_1, B'_2, ..., B'_{n-1} and B'_n are each independently hydrogen, halogen, hydroxy, oxo, lower alkoxy, amino, lower alkylamino, di-lower alkylamino, lower alkyl or lower alkenyl (wherein

said lower alkyl and said lower alkenyl may be substituted with one or more, same or different substituents selected from the group consisting of hydroxy, lower alkoxy, amino and lower alkylamino, and

among B'_1, B'_2, ..., B'_{n-1} and B'_n, B'_i and B'_{i+2} (in which i is 1, 2 or 3) taken together with B_i, B_{i+1} and B_{i+2}, or B'_i and B'_{i+3} (in which i is 1 or 2) taken together with B_i, B_{i+1}, B_{i+2} and B_{i+3}, may form a C_5-C_6 cycloalkyl or an aliphatic heterocyclic group selected from <substituent group β_1>, and said cycloalkyl and said aliphatic heterocyclic group may be substituted with one or more, same or different substituents selected from lower alkyl and <substituent group α>);

R is hydrogen, lower alkyl, lower alkenyl, amino in which

the nitrogen atom is di-substituted with R_a and R_b, amino-lower alkyl in which the nitrogen atom is di-substituted with R_a and R_b, or L, wherein R_a and R_b are each independently hydrogen, lower alkyl, lower alkoxyalkyl or halogenated lower alkyl, and L is L_1-L_2-L_3 (wherein L_1 is a single bond, $-(CH_2)_{k1}-$, $-(CH_2)_{k1}-O-$ or $-(CH_2)_{k1}-NH-$ (in which k1 is an integer of 1 to 3); L_2 is a single bond or $-(CH_2)_{k2}-$ (in which k2 is an integer of 1 to 3); and L_3 is lower alkyl, lower alkoxy, C_3-C_6 cycloalkyl, phenyl, pyridyl, pyrrolidinyl or piperidinyl, said lower alkyl, lower alkoxy, C_3-C_6 cycloalkyl, phenyl, pyridyl, pyrrolidinyl or piperidinyl being optionally substituted with one or more fluorine atoms); or

a substituent selected from <substituent group α>, which may be substituted with one or more, same or different substituents selected from <substituent group γ>, or lower alkyl substituted with said substituent; or

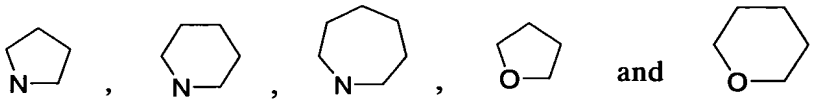
a cyclic group selected from <substituent group β_2>, which may be substituted with one or more, same or different substituents selected from a lower alkyl, <substituent group α> and <substituent group γ> and also may be substituted with J (wherein J is J_1-J_2-J_3; J_1 is a single bond, -C(=O)-, -O-, -NH-, -NHCO-, $-(CH_2)_{k3}-$ or $-(CH_2)_{k3}-O-$ (in which k3 is an integer of 1 to 3); J_2 is a single bond or $-(CH_2)_{k4}-$ (in which k4 is an integer of 1 to 3); and J_3 is lower alkyl, lower alkoxy, $-CONR_aR_b$ (wherein R_a and R_b each have the same meaning as defined above), phenyl, pyridyl, pyrrolidinyl or piperidinyl, said lower alkyl, lower alkoxy, phenyl, pyridyl, pyrrolidinyl or piperidinyl being optionally substituted with one or more fluorine atoms), or lower alkyl substituted with said cyclic group, and

in the above, <substituent group α>, <substituent group β_1>, <substituent group β_2> and <substituent group γ> each have the meanings shown below:

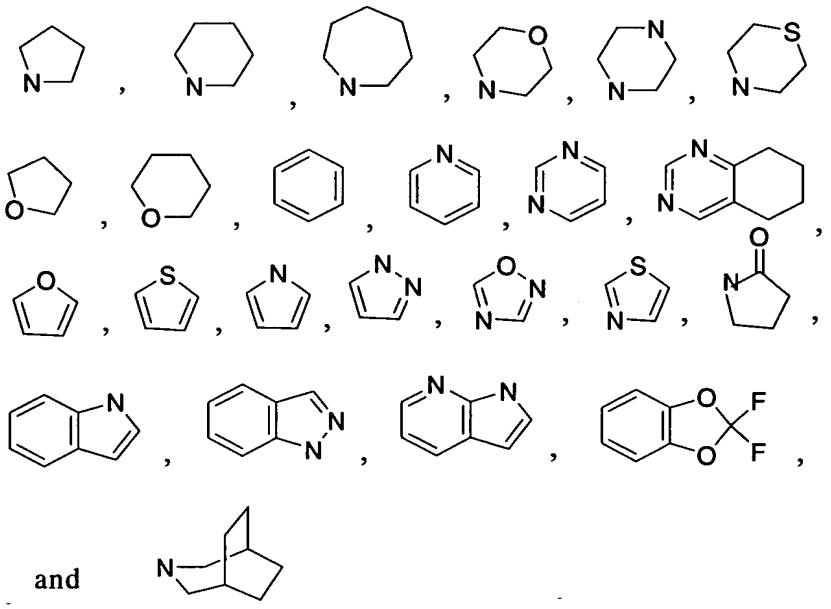
<substituent group α>

hydroxy, hydroxy-lower alkyl, cyano, halogen, carboxyl, lower alkanoyl, lower alkoxycarbonyl, lower alkoxy, lower alkoxyalkyl, amino, lower alkylamino, lower alkylsulfonyl, halogenated lower alkyl, halogenated lower alkoxy, halogenated lower alkylamino, nitro and lower alkanoylamino,

<substituent group β_1>



<substituent group β_2>



<substituent group γ>

C_3-C_6 cycloalkyl, lower alkyl substituted with C_3-C_6 cycloalkyl, phenyl, lower alkyl substituted with phenyl, pyridyl, pyrrolidinyl and piperidinyl, said C_3-C_6 cycloalkyl, phenyl, pyridyl, pyrrolidinyl and piperidinyl being optionally

substituted with one or more fluorine atoms.

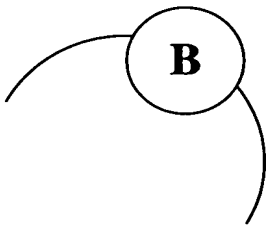
2. The compound according to claim 1 or a pharmaceutically acceptable salt or ester thereof, wherein;

X is NH or S; and

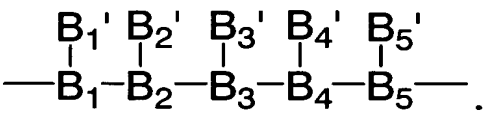
Y is O.

3. The compound according to claim 2 or a pharmaceutically acceptable salt or ester thereof, wherein;

the partial structure



is the formula:



4. The compound according to claim 3 or a pharmaceutically acceptable salt or ester thereof, wherein;

B_1, B_2, B_3, B_4 and B_5 are each independently CH; or

B_1, B_2, B_4 and B_5 are each independently CH, and B_3 is N or O.

5. The compound according to claim 4 or a pharmaceutically acceptable salt or ester thereof, wherein;

the <substituent group α> is selected from hydroxy, hydroxy-lower alkyl, halogen, lower alkoxycarbonyl, lower alkoxy, lower alkoxyalkyl, lower alkylamino, methyl substituted

with one to three fluorine atoms, methoxy substituted with one to three fluorine atoms and lower alkylamino substituted with one to three fluorine atoms; and the <substituent group β_1> is

.

6. The compound according to claim 5 or a pharmaceutically acceptable salt or ester thereof, wherein;

B_1, B_2, B_4 and B_5 are each independently CH, B_3 is N, and all of B'_1, B'_2, B'_3, B'_4 and B'_5 are hydrogen; or

one of B'_1, B'_2, B'_3, B'_4 and B'_5 is lower alkyl or lower alkenyl, and all the others are hydrogen; or

at least two of B'_1, B'_2, B'_3, B'_4 and B'_5 are each independently lower alkyl or lower alkenyl, and all the others are hydrogen; or

among B'_1, B'_2, B'_3, B'_4 and B'_5, B'_i and B'_{i+2} (in which i is 1, 2 or 3) taken together with B_i, B_{i+1} and B_{i+2} form an aliphatic heterocycle selected from <substituent group β_1> (wherein said aliphatic heterocycle may be substituted with one or more, same or different substituents selected from lower alkyl and <substituent group α>), and the others are hydrogen, lower alkyl or lower alkenyl.

7. The compound according to claim 6 or a pharmaceutically acceptable salt or ester thereof, wherein;

X is NH;

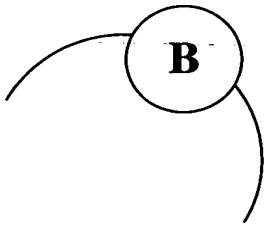
B_1, B_2, B_4 and B_5 are each independently CH, and B_3 is N;

among B'_1, B'_2, B'_3, B'_4 and B'_5, B'_i and B'_{i+2} (in which i is 1) taken together with B_i, B_{i+1} and B_{i+2} form an aliphatic

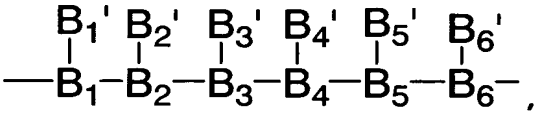
heterocycle selected from <substituent group β_1> (wherein said aliphatic heterocycle may be substituted with lower alkyl), and the others are hydrogen.

8. The compound according to claim 2 or a pharmaceutically acceptable salt or ester thereof, wherein;

the partial structure



is the formula:

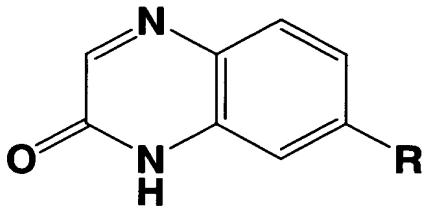


wherein B_1, B_2, B_3, B_5 and B_6 are each independently CH, and B_4 is N; among B'_1, B'_2, B'_3, B'_4, B'_5 and B'_6, B'_i and B'_{i+3} (in which i is 1 or 2) taken together with B_i, B_{i+1}, B_{i+2} and B_{i+3} form

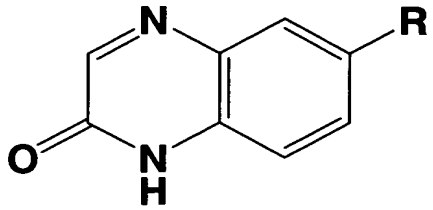
; and all the others are hydrogen.

9. The compound according to any one of claims 6 to 8 or a pharmaceutically acceptable salt or ester thereof, wherein;

the R binds to quinoxalinone as described in the following formula:



or



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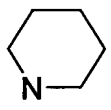
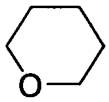
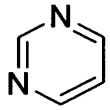
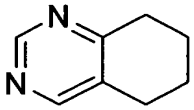
10. The compound according to claim 9 or a pharmaceutically acceptable salt or ester thereof, wherein;

R is hydrogen, amino-lower alkyl in which the nitrogen atom is di-substituted with R_a and R_b, or L, wherein R_a and R_b are each independently lower alkyl, and L is L_1-L_2-L_3 (wherein L_1 is a single bond, $-(CH_2)_{k1}-$, $-(CH_2)_{k1}-O-$ or $-(CH_2)_{k1}-NH-$ (in which k1 is an integer of 1 or 2); L_2 is a single bond or $-(CH_2)_{k2}-$ (in which k2 is an integer of 1 or 2); and L_3 is lower alkoxy or C_3-C_6 cycloalkyl); or

a cyclic group selected from <substituent group β_2>, which may be substituted with one or more, same or different substituents selected from lower alkyl and <substituent group α>, or lower alkyl substituted with said cyclic group, wherein the <substituent group β_2> is selected from


, 
, 
, and 
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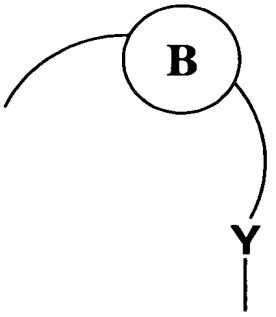
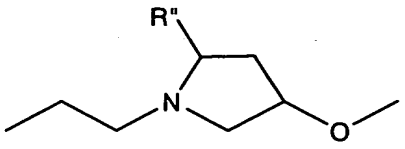
and the <substituent group α> is selected from halogen, lower alkoxy, lower alkoxyalkyl, methyl substituted with one to three fluorine atoms, and methoxy substituted with one to three fluorine atoms; or lower alkyl substituted with a substituent selected from the group consisting of lower alkylamino and lower alkylamino substituted with one to three fluorine atoms.

11. The compound according to claim 2 or a pharmaceutically acceptable salt or ester thereof, wherein;

the partial structure



is selected from the group consisting of



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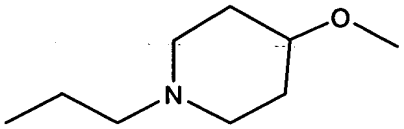

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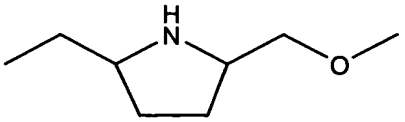

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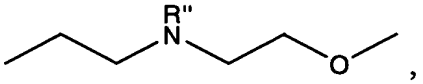

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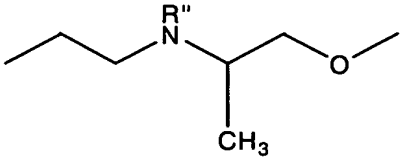

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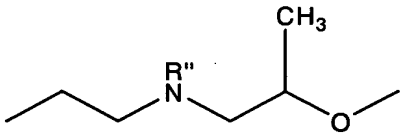
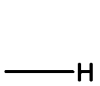


wherein R" is hydrogen or methyl; and

R is selected from the group consisting of



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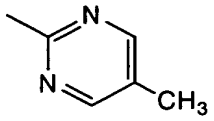

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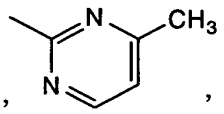

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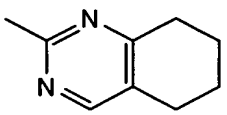

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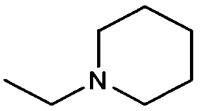

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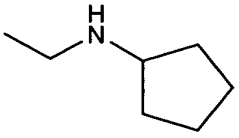

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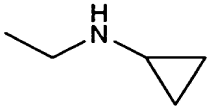

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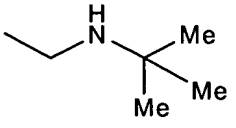

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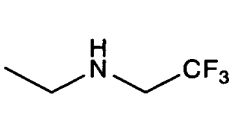
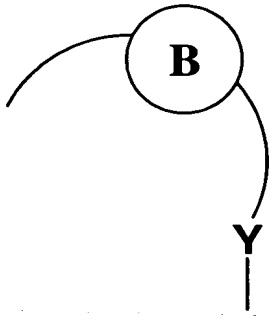


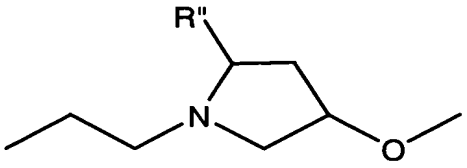
12. The compound according to claim 11 or a pharmaceutically

acceptable salt or ester thereof, wherein;

X is NH; and the partial structure



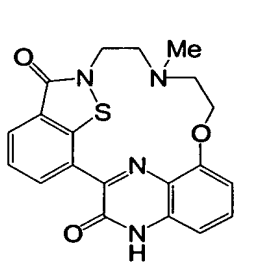
is the formula:



wherein R" is methyl.

13. The compound according to claim 1 or a pharmaceutically acceptable salt or ester thereof, wherein;

the quinoxalinone derivative is



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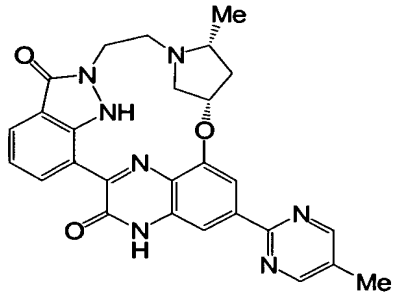

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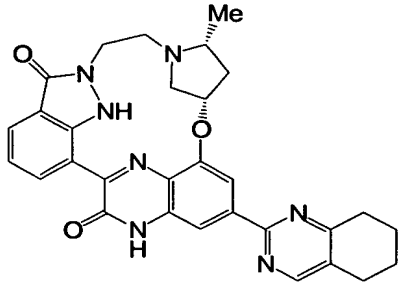

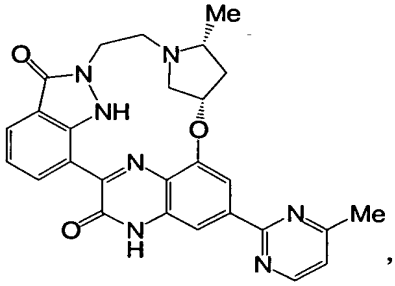

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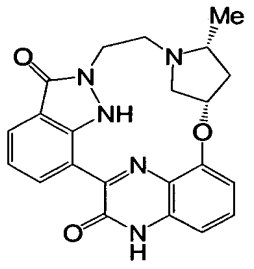

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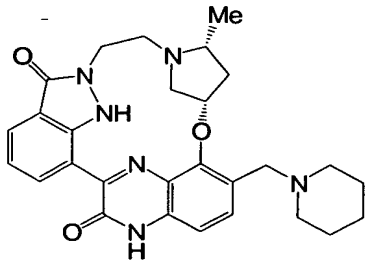

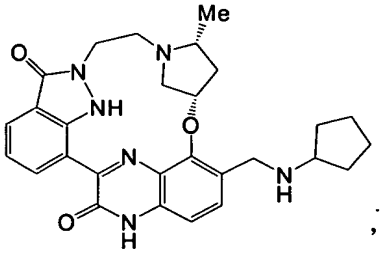
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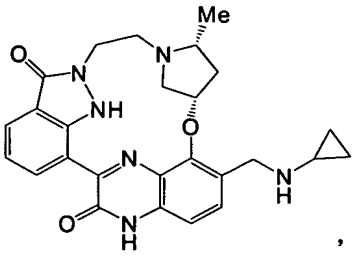
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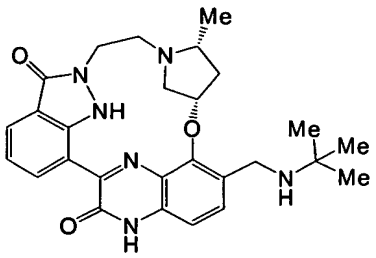
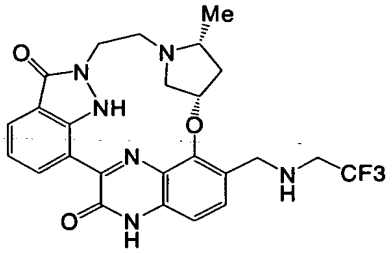


or 
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14. A pharmaceutical composition comprising one or more kinds of the quinoxalinone derivative according to claim 1 as an active ingredient, together with a pharmaceutically acceptable carrier or diluent.

15. A Cdk inhibitor comprising one or more kinds of the quinoxalinone derivative according to claim 1 as an active ingredient, together with a pharmaceutically acceptable carrier or diluent.

16. An anti-cancer agent comprising one or more kinds of the quinoxalinone derivative according to claim 1 as an active ingredient, together with a pharmaceutically acceptable carrier or diluent.